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Determination of bariatric surgery outcomes: prospective study

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ABSTRACT

Aims: Obesity and related problems are an important health problem whose prevalence has increased in recent years. Bariatric surgery is one of the accepted clinical treatment methods for obesity. However, the obesity-related problems that bariatric surgery corrects and the problems it causes are not clear. The aim of the study is to determine the recovery status and problems experienced in obesity and related problems in patients who have undergone bariatric surgery.

Methods: 185 individuals who underwent bariatric surgery participated in the study. A 24-question data collection form, prepared by the researchers in line with the literature and including sociodemographic data, pre- and post-operative weight changes, problems experienced due to obesity, problems resolved after surgery, and problems experienced due to surgery, was used.

Results: It was determined that 18.4% (n=34) experienced postoperative complications. most common problems are hair loss (66.4%) and vitamin deficiency (55.1%) after surgery. 74% of individuals reported taking vitamin supplements. After the surgery, it was found that most o related to psychological (60.5%), j f the individuals (41.37%; n=12) had gallbladder surgery. After the surgery, individuals reported improvement in symptoms oint (48.6%), eating and respiratory problems (46.4%; 43.2%). When the type of surgery was compared with revision surgery, presence of complications, postoperative psychological support, and vitamin supplement use, no statistically significant relationship was found (p>0.05).

Conclusion: Our research shows that it is important to monitor the long-term health status of individuals who have undergone bariatric surgery.

Keywords: Bariatric surgery, obesity, complication

INTRODUCTION

Obesity is one of the important health problems whose rate is increasing today.[1] The World Health Organization (WHO) defines obesity as abnormal or excessive fat accumulation that poses a risk to health. According to WHO, individuals with a body mass index over 25 kg/m² are considered overweight, while individuals with a body mass index over 30 kg/m² are called obese.[2] Age, gender, education level, smoking-alcohol use, genetic factors, environmental factors, eating habits and psychological problems are effective in the formation of obesity.[3] Obesity brings with it serious health problems.1 These; insulin resistance, type 2 diabetes, metabolic syndrome, coronary heart disease, hyperlipidemia, gallbladder diseases, stroke, sleep apnea, fatty liver, asthma, musculoskeletal problems, menstrual irregularities, pregnancy complications, and some types of cancer. Obesity is also one of the health problems that increases the risk of complications after surgery.[4] In addition to the physiological effects of obesity, it has been reported that it has psychological effects on individuals such as low self-esteem, depression, anxiety disorders, sexual function and sleep disorders.[5] Recent studies have shown that more than 1,2 million of the deaths in the European region of the World Health Organization are caused by obesity, accounting for 13% of the total causes of death and ranking fourth among the causes of death.[6]

Treatment methods used for obesity are grouped under five groups. These include non-surgical and surgical methods; diet, exercise, behavioral change, pharmacological treatment and surgical treatment.[7] Surgical treatment is applied to those whose body mass index (BMI) is over 40 kg/m² or whose BMI is 35 kg/m² and who has an accompanying disease accompanied by comorbidity. Surgical treatment is a treatment method applied to lose weight and prevent comorbid diseases.[8] The general name given to surgical treatment is bariatric surgery, and there are different types. These are: Gastric bands, Sleeve

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gastrectomy (SG), Biliopancreatic diversion (BPD) Jejunoileal bypass, Combined restrictive and malabsorptive Mini gastric bypass, Roux-Y gastric bypass, BPD with duodenal switch.[8] There are risks of postoperative complications in bariatric surgery, especially those related to obesity. Leak, peritonitis, bleeding, stomal obstruction, internal hernia, marginal ulcer, fistula, gastroesophageal reflux, aletelctasis, pneumonia, long-term vomiting and diarrhea, weight regain, nutritional imbalances, psychosocial problems are among the risks seen after surgery.[9]

It is important to take the necessary precautions against complications that may occur after the surgery, to monitor the patient and to follow up after discharge. In this regard, physicians and nurses play an important role in patient follow-up through multidisciplinary team work. When we look at the literature, there are a limited number of studies revealing the effects of obesity surgery on patients and the care needs of patients. The aim of this study is to determine the recovery levels of obesity-related problems of individuals who have undergone bariatric surgery and the problems they experience after surgery, and to determination of the postoperative care and education needs of patients in this context.

METHODS

Ethics

Before starting the study, ethical approval was obtained from Ankara Yıldırım Beyazıt University Health Sciences Ethics Committee (Date: 16.03.2023, Decision No: 03-95). Additionally, written and verbal consent was obtained from the patients. This study was performed in line with the principles of the Declaration of Helsinki.

Type of Research

It was conducted descriptively in order to determine the recovery levels of obesity-related problems of individuals who underwent bariatric surgery and the problems they experienced after surgery, and to determination of the postoperative care and education needs of the patients in this context.

Population and Sample of the Research

The population of the research online consists of individuals who applied to a physician to receive consultancy services regarding healthy living and weight control between 16.03.2022 and 16.06.2023, and who underwent bariatric surgery. 185 individuals who met the inclusion criteria and volunteered to participate in the study were included in the study without sample selection. It was calculated as 0.99 the power of the study.

Inclusion Criteria

Individuals who agreed to participate in the study, were over 18 years of age, know how to read, write and speak Turkish, had no mental problems, and had at least 3 months and a maximum of one year after surgery were included.

Data Collection Tools

Tha data were collected through a survey containing 24 questions prepared by the researchers in line with the literature, aimed at determining the sociodemographic characteristics of the individuals, the physiological problems they experienced due to obesity and obesity surgery, the problems related to the obesity surgery they had undergone, and the status of receiving psychological support before and after surgery.[2-5]

Collection of Data

To collect data, individuals who received counseling services and underwent bariatric surgery were identified according to the inclusion criteria. The researchers contacted the individuals and explained the purpose of the study. The data collection form prepared for individuals who volunteered to participate in the study was delivered online, and the researchers asked for questions that were not understood.

One's contact information was shared with individuals. Informed consent was obtained from individuals before data collection.

Statistical Analysis

The data were analyzed in computer environment. Percentage distribution, mean, standard deviation, independent groups t test, one-way analysis of variance (ANOVA) test were used to evaluate the data. In all results, $p<0.05$ was considered statistically significant.

RESULTS

42.2% of the individuals participating in the research were in the 26-36 age group, 91.4% were women.

It was determined that 75.1% of them were married and 61.1% had a university education or higher. When the preoperative BMI of the individuals was examined, it was determined that 75.1% were in the group of 40 and more, and when the current BMI was considered, 34.1% were in the group between 25-29.9. 71.4% of the individuals participating in the study had a family history of obesity and 67% It was determined that 6 of them had weight problems in childhood. It was determined that 74.1% of the individuals did regular sports before the surgery, 87% did a regular diet, and 18.9% received psychological support before the surgery (Table 1).

It was determined that 80% of individuals who underwent bariatric surgery had sleeve gastrectomy and 20% had gastric bypass surgery. 3.8% of these individuals underwent revision surgery.

It was determined that 18.4% (n=34) experienced postoperative complications. Individuals; While they reported that the most common problems they experienced after surgery were hair loss (66.4%) and vitamin deficiency (55.1%); 74% of individuals reported taking vitamin supplements. After the surgery, it was found that most of the individuals (41.37%; n=12) had gallbladder surgery.

It was found that 15% of the patients' marital status changed after the surgery and 13.5% received psychological support. When the postoperative nutritional behavior of the individuals was examined, diet compliance behavior was detected in 41.6%, while emotional eating behavior was detected in 30.2% After the surgery, individuals, in order; reported improvement in symptoms related to psychological (60.5%), joint (48.6%), eating and respiratory problems (46.4%; 43.2%) of individuals.

Table 1. Distribution of individuals' descriptive characteristics

	Number	%
Age groups		
25 and less	10	5.4
26-36	78	42.2
37-47	68	36.8
48 and above	29	15.6
The average age	38.47±9.05	
Gender		
Woman	169	91.4
Male	16	8.6
Marital status		
Single	46	24.9
Married	139	75.1
Education status		
Primary education	23	12.4
High school	49	26.5
University and postgraduate	113	61.1
Live		
Marmara	73	39.5
Black Sea	12	6.5
Southeast	10	5.4
East Anatolia	5	2.7
Central Anatolia	44	23.8
Aegean	20	10.8
Mediterrenian	7	3.7
Abroad	14	7.6
Preoperative body mass index		
30 – 34.9 (First degree obese)	9	4.9
35-39.9 (Second degree obese)	37	20.0
40 and more (Third degree obese)	139	75.1
Current body mass index		
18-24.9 (Normal)	25	13.5
25-29.9 (Light fat)	63	34.1
30 – 34.9 (First degree obese)	53	28.6
35 -39.9 (Second degree obese)	30	16.2
40 and more (Third degree obese)	14	7.6
Family history of obesity		
There is	132	71.4
None	53	28.6
History of childhood obesity		
There is	125	67.6
None	60	32.4
Preoperative psychological support status		
Yes	35	18.9
No	150	81.1
Regular exercise before surgery		
Yes	137	74.1
No	48	25.9
Regular diet before surgery		
Yes	161	87.0
No	24	13.0
The impact of psychological factors on the decision to undergo surgery		
Yes	181	97.4
No	5	2.6

It was determined that psychological factors were effective in 97.4% of the patients' decision to undergo surgery (Table 2). When the individuals' age, gender, marital status, family obesity status, weight problem as a child, diet and exercise status, region of residence, pre-operative psychological support, and pre-operative BMI were compared, no statistically significant relationship was found between them (p>0.05).

Table 2. Distribution of individuals' characteristics regarding bariatric surgery and the postoperative period

	Number	%
Surgery type		
Stomach bypass (Roux-en Y gastric bypass, RNY Gastric bypass)	37	20.0
Gastric Sleeve Surgery (Sleeve gastrectomy)	148	80.0
Revision surgery status		
Yes	7	3.8
No	178	96.2
Post-operative re-operation (except revision surgery)		
Cholecystectomy	12	42.9
Skin prolapse	5	17.9
Polyp-cyst	3	10.7
Other*	8	28.5
Postoperative marital status change		
Yes	28	15.1
No	157	84.9
Development of postoperative complication		
Yes	34	18.4
No	151	81.6
Postoperative problems a		
Nausea	37	20.0
Vomiting	48	25.9
Vitamin insufficiency	102	55.1
Dumping syndrome	31	16.7
Hair spill	123	66.4
Constipation	61	32.9
Skin prolapse	64	35.5
Eat less	30	16.2
Other**	95	51.3
Symptom improvement after surgery		
Hypertension	40	21.6

When the type of surgery was compared with revision surgery, presence of complications, postoperative psychological support, and vitamin supplement use, no statistically significant relationship was found (p>0.05).

DISCUSSION

In this study, almost all of the patients reported that psychological reasons were effective in their decision for bariatric surgery. According to individuals' statements, the negative perspective of society seemed to be a big reason for making the decision to have surgery. It has been reported in the literature that the obese adults have 23-36% increased odds of developing depressed mood.[10] Similar to our research result, Callugi and Grave reported in their study that body image and weight concerns of individuals receiving obesity treatment were effective.[11]

Due to postoperative weight loss, an improvement was detected in the most common obesity-related joint, respiratory and eating problems in individuals. Obesity; It

affects osteoarthritis, osteoporosis and systemic inflammatory rheumatic diseases.[12] The fact that patients who lost weight after surgery reported improvement in joint problems may be associated with the positive effects of maintaining the ideal weight on the musculoskeletal system. Obesity also plays a major role in diseases such as obstructive sleep apnea syndrome, obesity hypoventilation syndrome, pulmonary hypertension, pneumonia, asthma is more common in obese individuals, and there is a strong relationship between COPD and obesity.[13] Fat accumulation in the abdominal and thoracic cavities and the mediastinal area causes the diaphragm to remain in an upward position, increasing pleural pressure and decreasing functional residual capacity (FRC). Factors that contribute to reduced lung compliance in obesity include increased thoracic blood volume, mediastinal fat compressing the lung, and closure of dependent airways resulting in atelectasis and increased alveolar surface tension.[14] While Chandrakumar et al.[15] reported an improvement in myocardial infarction,heart failure stroke and cardiovascular problems in individuals who underwent bariatric surgery, Pati et al.[16] reported that about 4-8% of all cancers are attributed to obesity. In our study, individuals; They stated that the problems related to obesity, which improved after surgery, mostly affected their daily life activities. In our research, in addition to the positive changes experienced by individuals after surgery, the problems they experienced were also reported. One of these was that postoperative individuals mostly reported that they had gallbladder surgery. After bariatric surgery, stones develop due to the increase in cholesterol levels in the gallbladder and saturation in bile mucin concentration, and rapid weight loss in a short time, weight loss more than 25% of the preoperative weight, triggers stone formation.[17] It has been reported that gallstones form in 3%-22% of bariatric patients within 12 months after surgery, and in 8%-30% within 24 months after surgery.[18] Approximately 4.7%-12% of obesity patients revealed that they had gallbladder surgery during active weight loss. Studies in the literature were similar to our study.[17-19] In addition, the individuals who participated in our research reported that they mostly experienced hair loss and vitamin deficiency after surgery. Bypassing a part of the gastric mucosa in bariatric surgery may lead to iron and B12 deficiency, and bypassing the duodenum and proximal jejunum may lead to impaired absorption of calcium and vitamin D from the intestines.[20-22] Bariatric surgery has also been reported to lead to decreased absorption of nutrients such as vitamins A, K, iron, selenium, zinc and copper.[23,24] The incidence of vitamin C deficiency in bariatric patients is 10-50%, calcium deficiency occurs in 10-25% at the end of the second year after surgery, 25-48% at the end of the fourth year, and vitamin D deficiency occurs in 17-52% and 50-63% of patients during the same period. deficiency has been reported.[25-28] Nutritional status after bariatric surgery may also affect vitamin deficiency and lead to low protein intake. This situation may cause an increase in hair loss.[20,29] According to the meta-analysis conducted by Zhang et al.[30], the incidence of hair loss in bariatric patients was reported to be 57%. Research results in the literature were similar to our results.

Limitations

This is a study that describes the positive and negative consequences of bariatric surgery. In the research, it would be more useful to check the patients at regular intervals in a clinical environment and support them with measurements of health-related parameters.

CONCLUSION

After bariatric surgery, monitoring the weight loss and improvement in comorbidities in patients is very important for their quality of life. Physiological, psychological and sociological follow-up of the patient in the postoperative period with the understanding of a multidisciplinary team can enable early diagnosis of complications, development of positive eating behavior in patients and increased compliance. Similar to results of this study, it may be recommended to monitor patients' levels such as zinc, biotin, and iron, to take supplements if necessary, and to provide structured training and consultancy services starting in the preoperative period in order to eliminate effects that will negatively affect the body image of patients, such as hair loss. Again, according to the results of our study, it is noteworthy that patients most frequently undergo gallbladder surgery after bariatric surgery. In this context, it is recommended to perform ultrasonography routinely to detect stones and mud before surgery, to follow up patients with pathological findings and provide consultancy services, and to provide patients with a healthy lifestyle regarding proper nutrition and physical activity in the postoperative period.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of Ankara Yıldırım Beyazıt University Health Sciences Ethics Committee (Date: 16.03.2023, Decision No: 03-95).

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

Data availability statement

All data generated or analyzed during the present study are included in this published article.

REFERENCES

1. Erem C. Prevalence of overweight and obesity in Turkey. *IJC Metab Endocr.* 2015;8:38-41.
2. World Health Organisation (WHO). 2018 [cited 2024 January 24]. Obesity. Available from: https://www.who.int/europe/news-room/fact-sheets/item/the-challenge-of-obesity

3. Republic of Turkiye Ministry of Health General Directorate of Public Health. 2023 [cited 2024 January 06] Obesity. Available from: https://hsgm.saglik.gov.tr/tr/obezite/obezitenin-nedenleri.html
4. Segula D. Complications of obesity in adults: a short review of the literature. *Malawi Med J*. 2014;26(1):20-24.
5. Şengönül M, Arancıoğlu İÖ, Maviş ÇY, Ergüden B. Obesity and psychology. *Haliç Uni J Health Sci*. 2019;2(3):1-12.
6. World Health Organisation (WHO). WHO European Regional Obesity Report 2022 [cited 2024 January 24] Available from: https://apps.who.int/iris/bitstream/handle/10665/353747/9789289057738-eng.pdf
7. Kahraman MS, Güriz SO, Özdel K. Adulthood obesity: a general review for biological and psychological treatment. *J Clin Psy*. 2014;17(1):28-40.
8. Öcal H, Aygen E. Surgical treatment of obesity. *Fırat Med J*. 2018;23:78-87.
9. Tuna A. Nursing Care in Gastrointestinal System Diseases. In: Çelik S, ed. Current Practices in Surgical Nursing. Çukurova Nobel Medicine Publisher: 2021:469-470.
10. Fulton S, Décarie-Spain L, Fioramonti X, Guiard B, Nakajima S. The menace of obesity to depression and anxiety prevalence. *Trends Endocrinol Metab*. 2022;33(1):18-35.
11. Calugi S, Dalle Grave R. Psychological features in obesity: a network analysis. *Int J Eat Disord*. 2019;53(2):248-255.
12. Koçak B. The relationship between bone-joint diseases and obesity. *J Health Life Sci*.2021;3(1):97-100.
13. Turgut E, Kaplan K, Okut G, et al. Ten years single center bariatric surgery experience. *Laparoscop Endoscop Surg Sci*. 2021;28(4):163-168.
14. Hegewald MJ. Impact of obesity on pulmonary function: current understanding and knowledge gaps. *Curr Opin Pulmonary Med*. 2021;27(2):132-140.
15. Chandrakumar H, Khatun N, Gupta T, Graham-Hill S, Zhyvotovska A, McFarlane SI. The effects of bariatric surgery on cardiovascular outcomes and cardiovascular mortality: a systematic review and meta-analysis. *Cureus*. 2023;15(2):1-26.
16. Pati S, Irfan W, Jameel A, Ahmed S, Shahid RK. Obesity and cancer: a current overview of epidemiology, pathogenesis, outcomes, and management. *Cancers*.2023;15(2):485.
17. Li VKM, Pulido N, Fajnwaks P, Szomstein S, Rosenthal R. Predictors of gallstone formation after bariatric surgery: a multivariate analysis of risk factors comparing gastric bypass, gastric banding, and sleeve gastrectomy. *Surg Endosc*. 2009;23(7):1640-1644.
18. Haal S, Guman MSS, Boerlage TCC, et al. Ursodeoxycholic acid for the prevention of symptomatic gallstone disease after bariatric surgery (UPGRADE): a multicentre, double-blind, randomised, placebo-controlled superiority trial. *Lancet Gastroenterol Hepatol*. 2021;6(12):993-1001.
19. Unalp-Arida A, Ruhl CE. The burden of gallstone disease in the United States population. *medRxiv*. 2022;07:1-30.
20. Güven B. Bariatric surgery complications and nursing care. *J Nurs Educat Res*. 2019;16(2):139-143.
21. Corbeels K, Verlinden L, Lannoo M, et al. Thin bones: vitamin D and calcium handling after bariatric surgery. *Bone Rep*. 2018;8:57-63.
22. Saad R, Habli D, Sabbagh RE, Chakhtoura M. Bone health following bariatric surgery: an update. *J Clin Densitometry*. 2020;23(2):165-181.
23. Bahardoust M, Eghbali F, Shahmiri SS, et al. B1 vitamin deficiency after bariatric surgery, prevalence, and symptoms: a systematic review and meta-analysis. *Obesity Surg*. 2022;32(9):3104-3112.
24. Punchai S, Hanipah ZN, Meister KM, Schauer PR, Brethauer SA, Aminian A. Neurologic manifestations of vitamin B deficiency after bariatric surgery. *Obes Surg*. 2017;27(8):2079-2082.
25. Corbeels K, Verlinden L, Lannoo M, et al. Thin bones: vitamin D And calcium handling after bariatric surgery. *Bone Rep*. 2018;8:57-63.
26. Chakhtoura MT, Nakhoul NN, Shawwa K, Mantzoros C, Fuleihan G. Hypovitaminosis D in bariatric surgery: a systematic review of observational studies. *Metabolism*. 2016;65(4):574-585.
27. Lespessailles E, Toumi H. Vitamin D alteration associated with obesity and bariatric surgery. *Experim Biol Med*. 2017;242(10):1086-1094.
28. Carrasco F, Basfi-Fer K, Rojas P, et al.Calcium absorption may be affected after either sleeve gastrectomy or Roux-en-Y gastric bypass in premenopausal women: a 2-y prospective study. *Am J Clin Nutr*. 2018;108(1):24-32.
29. Smolarczyk K, Meczekalski B, Rudnicka E, Suchta K, Szeliga A. Association of obesity and bariatric surgery on hair health. *Medicina*. 2024;60(2):133-141.
30. Zhang W, Fan M, Wang C, et al. Global bariatric research collaborative. hair loss after metabolic and bariatric surgery: a systematic review and meta-analysis. *Obes Surg*. 2021;31(6):2649-2659.